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# The Coping Strategies Patterns Based on Local Wisdom and Resilience Capital in Facing Natural Disaster Risk in Nagari Mandeh, Indonesia

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**ABSTRACT**

This article describes coping strategies based on local wisdom and community resilience capital in Nagari Mandeh, Pesisir Selatan Regency, Indonesia, facing the risk of natural disasters. The research approach used in this article is qualitative, with data collection methods in observation, in-depth interviews, and focus group discussions. The results found in the research written in this article are that the people in Nagari Mandeh have coping strategies as a form of resilience to disasters. Moreover, in building community resilience to disaster risk, Mandeh has some local wisdom pioneered by their predecessors, including the role of *Niniak Mamak* in fostering their nephew's children, where *Ninik Mamak* has a very central function in the Nagari. Finally, this article also describes the capital of community resilience in Nagari Mandeh, which supports preparedness to face the threat of natural disasters.

## 1. INTRODUCTION

The potential for natural disasters to cause substantial social, economic, and environmental losses is a significant public policy challenge for governments and communities worldwide [1]. The global cost of dealing with natural disasters averaged USD$212 billion per year until 2018 [2] and one of these is climate change which is predicted to add up to 50% of the global costs of extreme weather events by 2040 [3, 4].

According to LIPI research conducted by geophysicist [5], the West Coast of Sumatra is one of the areas that has the highest vulnerability to natural disasters, especially earthquakes, with the highest tsunami potential in Indonesia due to the confluence of two active plates, namely the Euro-Asia and Indo-Australia plates and due to some Most of the population is in disaster-prone areas and the coast. Pesisir Selatan Regency, as one of the areas in West Sumatra Province, which is located on the west coast of Sumatra, should try to prevent the impact of natural disasters such as building community resilience and caring about the risk of natural disasters by using local values that have existed so far in Indonesia. Creating a culture of community resilience in dealing with and preventing disaster impacts requires innovative, appropriate, economical, logical, and oriented to people and their needs. Trends in loss of human life and property damage show that our Society is not sufficiently resilient to natural disasters. Over the past few decades, many authors have emphasized the need to accommodate the concept of resilience in the research, policy, and disaster risk reduction arenas [6].

Building a community-based disaster management system is an effort to strengthen disaster resilience at the community level. This is important because of the limitations of the government and disaster management agencies in assisting in the event of a disaster. In addition, this system aims to maximize the resources owned by the community to help themselves, their families, and communities in the event of a disaster. System development begins with mapping the threat of catastrophe and analyzing disaster risk in the community. Building community resilience to disasters is a crucial step to reducing risk and becoming more adaptive to survive the various threats of natural and man-made disasters [7, 8]. Furthermore, resilience can mean ensuring that people will have the capacity to prevent, anticipate, mitigate, absorb and adapt to various uncertainties, risks, stresses and threats [9, 10].

With the various meanings and definitions of resilience, the consensus that emerges is that resilience describes "the ability of an individual, community, environment, institution or system to positively cope with rapidly occurring shocks or significant and protracted resources. stress" [10, 11]. This is a

fairly complex concept, so it can be interpreted depending on the chosen field of study. The concept of resilience has evolved based on how it is used, from the sciences and ecology to the social and behavioural sciences. Many studies trace the first use of the term resilience to the fields of physics and mathematics [12, 13], psychology and medicine [12, 14] and ecology [15]. It eventually diversified into other fields, such as economics and sociology [12, 16]. The following scholars have studied resilience [12-15, 17-25] have agreed that C.S. Holling has made a significant contribution by using the concept of resilience in 1973 [26]. He defined it as the ability of a system to return to a steady state after experiencing a disturbance [10].

The previous definition uses resilience in the human-environment sense because it was initially developed as an ecological concept [15, 19]. This follows the premise that resilience, particularly socio-ecological resilience, is about people and the environment as interdependent systems [10, 20].

Resilience to disasters acts as a community protective factor with stability to risk by planning, coping, absorbing, and adapting to natural hazards [27]. Capital that supports disaster resilience includes social cohesion, access to economic resources, governance and institutional arrangements, service provision and support, risk awareness, and disaster planning [4, 28-36].

This local wisdom is not explicitly related to disaster management but can be used as a strategy to optimize disaster risk reduction efforts further. Disaster risk reduction based on local wisdom will be more acceptable and adopted by the community because it is in accordance with the social and cultural conditions in the community.

To bind commitments between elements of Society in increasing preparedness to face the threat of natural disasters, efforts are needed to unite the perceptions of stakeholders such as the Government, religious leaders, traditional leaders, community and youth leaders, as well as local Niniak Mamak. So far, efforts to improve preparedness have tended to be dominated by the initiatives of non-governmental organizations by inviting the community to participate. To bind this commitment, initiatives from stakeholders are needed to formulate strategies to increase community preparedness based on local wisdom.

For this reason, this article aims to encourage both relevant disaster management stakeholders and the community in Nagari Mandeh to be more aware of the importance of disaster risk reduction efforts as an integrated part of disaster management in building community resilience to disasters. This study will bridge the factual conditions in Nagari Mandeh related to vulnerability to disasters and what disaster risk reduction strategies are needed by Nagari Mandeh in dealing with natural disasters, and the obstacles faced in implementing these strategies.

## 2. METHODOLOGY

In this study, qualitative methods were used to gain a broad and in-depth interview to understand community resilience to the risk of natural disasters. In addition, various factors related to the factual conditions that exist in Nagari Mandeh are compared with the threat of disasters so that they can be observed and studied holistically so that the model that will be developed can be applied to design coping strategies and capital for community resilience against the risk of natural disasters.

In this study, the researcher used the following data collection: First, conducting library research, namely research conducted by searching, collecting and studying books and other existing literature in order to see the problems studied, obtaining secondary data that will be used as the basis for research. In this study, secondary data were obtained from books, scientific articles, related regulations and policies, leaflets, and information from the internet about disaster resilience in Nagari Mandeh. Second, through field research, namely research conducted by direct observation of the object under study. Conducting research directly in the field is useful to find out the problems that occur and to obtain the primary data needed.

Third, conducting in-depth interviews, namely collecting data and facts by conducting direct questions and answers or asking for direct explanations from parties related to the object of research. The interview used is an unstructured interview. As stated by Mundir [37] "Unstructured interviews are free interviews where researchers do not use interview guidelines that are arranged systematically and completely for data collection". Unstructured or open interviews aim to be able to conduct more in-depth research on informants and based on the honesty of the informants. While the nature of the questions asked are open questions, this will allow researchers to obtain as much information as possible, so that there is no misinterpretation in understanding the answers of the informants [37].

This research was carried out in the Nagari Mandeh area with the aim of various institutions/institutions/communities who are stakeholders related to disaster resilience in Nagari Mandeh both from the community and government agencies as well as civil society institutions in the form of Non-Governmental Organizations. Organization (NGO).

Furthermore, to obtain primary data in this study, it is necessary to determine informants who are considered to know and can be trusted to become key informants who have relevance to the research topic. The following is a list of informants for this study as shown in Table 1 below:

**Table 1.** Research informant

| No | Institution | Identification of informers |
|---|---|---|
| 1. | Mandeh Nagari Government and Community | a) Wali Nagari Mandeh<br>b) Secretary of Nagari Mandeh<br>c) Nagari Mandeh government employee.<br>d) Head of the Nagari Deliberative Body<br>e) Members of the Nagari Deliberative Body<br>f) Community Leaders in Nagari Mandeh<br>g) Community in Nagari Mandeh. |
| 2. | BPBD of Coastal Selatan Regency | a) Head of Prevention and Preparedness<br>b) Staff for Prevention and Preparedness |
| 3. | Activists/Disaster Activists | Tsunami Alert Community Disaster Preparedness Group |

## 3. RESULTS AND DISCUSSION

Nagari Mandeh in Pesisir Selatan Regency, as one of the areas most prone to natural disasters, especially earthquakes with the potential for a tsunami on the west coast of Sumatra Island, certainly requires the concept and application of disaster management policies in the form of a pattern of community resilience in the face of excellent and measurable disaster threats. A comprehensive disaster management policy can minimize the number of victims in a disaster. In terms of pre-disaster policies as the focus of disaster risk reduction, Pesisir Selatan Regency Government, in collaboration with NGOs, has designed various programs to improve preparedness and carry out mitigation activities.

Among the preparedness programs are providing education and training on readiness against the threat of disasters to government officials, schools, and the community. Meanwhile, in terms of mitigation, there are efforts to provide adequate and safe infrastructure against disasters, such as the availability of roads and evacuation sites, structuring and monitoring earthquake-resistant buildings, and improving the tsunami early warning system.

On the one hand, the programs carried out by the Government and related elements as part of the natural disaster risk reduction strategy have indeed been implemented or are in progress. On the other hand, one of the improvements that will be proposed is how to adopt local wisdom that exists in the community as part of building community resilience in the face of disaster threats. The proposed local wisdom is wisdom that exists in the community and is used from generation to generation in traditions, culture, and habits.

From the results of field observations, the programs carried out by the Government or other elements have not adopted local wisdom as part of the disaster risk reduction strategy. Instead, many of the programs were adopted from disaster management models abroad, such as in Japan and the United States. The two countries have experience handling natural disasters, but socially and culturally, they differ from Indonesia.

Community resilience to disasters is not always built on a top-down basis. When government intervention has not touched disaster-prone communities or is poorly understood by the community due to different interpretations, many disaster-prone communities develop resilience methods based on local knowledge, as reflected in Nagari Mandeh.

To bind commitments between elements of Society in increasing preparedness to face the threat of disasters, efforts are needed to unite the perceptions of stakeholders such as the Government, religious leaders, traditional leaders, community and youth leaders, and Niniak Mamak. So far, efforts to improve preparedness have tended to be dominated by the initiatives of non-governmental organizations by inviting the community to participate. To bind this commitment, initiatives from stakeholders are needed to formulate strategies to increase community resilience based on local wisdom.

The role of this Niniak Mamak is to consolidate her nephew's children, so they are prepared for disasters. For this reason, Niniak Mamak is involved in every stage of the formulation and implementation of the disaster management program. It is hoped that with Ninik Mamak, all programs will be easily implemented at the community level. For example, in public education, which non-governmental organizations have mostly done, the Ninik Mamakcan formally participate in providing education to their nephew's children because the interaction between Ninik Mamak and her nephew's children is more intensive. In a Nagari, various problems of nephews related to living in the village were discussed by Ninik Mamak from various tribal leaders of the clan together with clever scholars and the Nagari Government at the balerong in Kerapatan Adat Nagari (KAN).

The results of this consensus deliberation are used as guidelines in managing social life in a Nagari, and this is where the traditional customs and traditions are formulated, which are adapted to the needs of the situation, conditions and community developments, and the progress of the times which of course still refers to the foundation of Adat Basandi Syarak, Syarak Basandi Kitabullah (customs based on religion, religion based on the Book of Allah). And disaster problems also include Nagari problems that must be solved jointly by Kaum Niniak Mamak, Alim Ulama dan Cadiak Pandai (groups of uncles, religious leaders, and intellectuals)

In Minangkabau, Ninik Mamak is a must" bajalan luruih, bakato bana" (walk straight, speak the truth) in everyday life and "Niniak Mamak dalam nagari pai tampek batanyo pulang tampek babarito "(Niniak Mamak in the nagari, go to the place to ask questions and return to the place to give news) who made Niniak Mamak a role model and a place to report various problems in the daily lives of her children and nephews.

This is in accordance with an expression in Minangkabau regarding the role of Niniak Mamak "Anak Dipangku Kamanakan Dibimbiang"(children are hugged, and nephews are guided). Ninik Mamak has even become the primary source of decision-making and a place to ask questions and disseminate new information. Institutionally in the structure of the Nagari Government, Niniak Mamak is a member of the Nagari Deliberative Body, which functions as a controller of every policy from the Wali Nagari.

In the Community Resilience model in dealing with disaster threats, the role of ninik Mamak is centralized in every activity, for example, public education, determining evacuation routes and locations, and tsunami early warning system mechanisms; Ninik Mamak groups must contribute optimally because they are the ones who know best about the conditions of their respective areas.

Ninik Mamak is representatives of their tribes in the Nagari Government who represent their constituents to convey and fight for the aspirations of the people they lead and to help solve various problems that arise in their nieces and nephews in the Nagari. Socially, the Mandeh community's resilience stems from the social structure, which is still thick with the values of Minangkabau socio-cultural life. The matrilineal culture makes the Ninik Mamak position which comes from the mother's lineage, carry social implications so that the Ninik Mamak part has an essential role in the life of a family and people. The still-strong role of Ninik Mamak is a potential social capital in building community resilience to disasters. Niniak Mamak can act as role models for her children and nephews, including providing constructive direction and input. In Mandeh, Niniak Mamak must be responsible for not only their children but also their nieces and nephews in various fields of life if there is a nephew experiencing difficulties, for example, in the economy.

The results of this consensus deliberation are used as guidelines in managing social life in a Nagari, and this is where the traditional customs and traditions are formulated, which are adapted to the needs of the situation, conditions and community developments, and the progress of the times which of course still refers to the foundation *Adat Basandi Syarak*

*Syarak Basandi Kitabullah.*

The second local wisdom is the Minangkabau traditional philosophy in the form of "alam takambang jadi guru" (nature as a teacher), which is also the main capital for building community resilience in the face of disaster threats. Alam takambang jadi guru means, Minang people must be dynamic and can learn from nature. Minang people must be able to adapt and develop themselves wherever they are. Whether in the village or overseas, Minang people are required to be a blessing to the whole of nature. This adage implies that humans always try to investigate, read, and study the provisions contained in the universe [38].

A conclusion will be obtained from investigations carried out many times that can be used as a teacher and a place to explore knowledge. It is a stipulation in Minangkabau custom that the developed nature that is studied carefully is a material of knowledge that can be used in regulating the life of human Society. That this proverb becomes the argument that the ancestors of the Minangkabau people used natural laws such as flora, fauna, and other objects such as humans.

To anticipate tidal wave and tsunami activities, the community is promoting the re-planting of mangroves and maintaining the continuity of the existing mangroves along the coast of Mandeh. In this case, the local knowledge of the Mandeh people obtained from their ancestors is in line with the concept of mitigation in universal knowledge. Although the community has traditionally believed that the Nagari they live in is relatively safe from the tsunami disaster because i) it is located in a bay, ii) the origin of the word Mandeh is mahandeh (to stop). This Nagari, at the beginning of its growth, became the safest stopover place for sailors who sailed from Muko-Muko Bengkulu to Padang during storms and big waves, and iii) the absence of historical records or oral stories that record the traces of the tsunami – it does not make people unaware of the tsunami threat, especially after they witnessed the Aceh tsunami through the media and experienced the tsunami swept by the Mentawai earthquake in November 2010.

Referring to the tsunami risk management procedure [39] adaptation (accommodation) is one of the options for disaster resilience that can be done. Adaptation is related to restoration activities on coastal vegetation. Although the tsunami resilience program prioritizes the latest knowledge-based methods, including the construction of a sea wall [40], in the case of Mandeh, the adaptation pattern is considered the most appropriate because it is closest to the daily life of the community.

Indirectly, this adaptation pattern is related to the flow of eco-socialism, which is implicitly embraced by the Mandeh community. Adequate protection of the environment and conservation of resources can be more easily achieved through a collective system [41] which then has implications for the sustainability of the local economy. The preservation of mangrove forests is one of the critical factors for the economic success of the Nagari Mandeh community. Therefore, mobilizing the Nagari Mandeh community to protect the mangroves is not a complicated matter. Mangrove vegetation that is well maintained is a source of food for fish in the ocean in general and fish cages specially cultivated by the community.

However, not all local knowledge is still maintained and implemented consistently. In the case of settlement arrangement, local knowledge, passed down from generation to generation, begins to be eroded and replaced by universal knowledge; all that remains is the model of the stilt house, which was adopted in anticipation of the tidal inundation/rob. The homes built in the initial location of the Nagari, known as the Kampuang Tangah area, have a relatively high stilt house model, while the houses in the Kampuang Baru area apply the model of a place on stilts that is not too high.

Kampung Tangah, as the origin of settlement in Nagari Mandeh, is a relatively flat area. Referring to the knowledge, houses built in the sandy lowlands were the least affected by the earthquake, while those in the highlands were the most vulnerable [42]. However, along with the increase in population and increasing demand, the village has developed closer to the river mouth, which is geologically vulnerable to earthquakes. When an earthquake rocked the city of Padang and its surroundings on September 30, 2009, many houses in the development area (Kampuang Baru) collapsed compared to houses in the original village (Kampuang Tangah).

Local traditions also lead the community to understand natural signs when a disaster lurks. In Iskandar's notes, if nature is angry so that natural disasters occur in the form of floods, landslides, volcanic eruptions, and so on, then traditional communities generally have local knowledge and ecological wisdom in predicting and mitigating natural disasters in their area. This includes using indicators of various wild animals that go down slopes out of the ordinary under normal environmental conditions [43].

Until now, people in Mandeh still believe that natural disasters are marked by the sound of a kuok (a type of peacock) buzzing around the village. This sound they will not hear on a typical day / normal. In addition, the community believes that large stones (the type of parent rock) located in the hills that surround their village will emit a sound that echoes each other as a message that disaster will come. Therefore, the mountain where these large stones are located has become a sacred place by the community. In recent times, the number of visitors has been decreasing, along with the sound of large stones no longer being heard, although several disasters have hit Nagari Mandeh, especially flash floods from the river.

The erosion of local knowledge can also be seen in the construction of houses. If the old houses in Mandeh are mainly made of wood, the places mostly found and inhabited by the community today are built using cement (permanent dwellings). Wood as a building material is still relatively easy to see in the forests that surround this area. Wood was chosen as the primary building construction material by our ancestors in almost all areas of Sumatra due to the vulnerability of this region to earthquake disasters. The constant threat of earthquakes makes residents reluctant to construct more substantial building types (using stone, brick, clay) and prefer to make houses out of wood [42]. The prestige factor and the influence of modernity seem to influence the way people construct their homes.

Local knowledge is usually obtained from rich empirical experience due to interacting with the environment. Unfortunately, much local knowledge of various ethnic groups in Indonesia is experiencing erosion and even extinction [43]. The decline of understanding local knowledge is related to how knowledge is understood. For adherents of the positivism paradigm, local knowledge does not represent objective and scientific knowledge. It seems that this has coloured the mindset of the people, especially the younger generation in Mandeh today. Local knowledge derived from understanding nature is considered non-contextual and not connected with things obtained at the education level. Over time, local knowledge, which tends to be undocumented and leaves no

trace, is replaced by universal knowledge, which sometimes ignores regional characteristics.

The third local wisdom is the importance of the Surau (mosque) in various aspects of life in Minangkabau. The surau is used to gather, meet, and study religion. Surau also has a cultural function that bridges religious and social life. In Minangkabau, this cultural and community activity centre is generally separated from the mosque and given to the Surau. The Surau functions as a place for daily prayer, a place for the Quran, to study religion, a dormitory for students studying, a place to celebrate major Islamic holidays, a place for religious ceremonies, a place to meet, gather, have a meeting, and others.

According to the Minangkabau traditional pattern, the Surau belongs to the people and is a complement to Rumah Gadang (Minangkabau Traditional House) [9]. However, not all Rumah Gadang have it because the existing Surau can still accommodate youths to spend the night, travellers, and traders when passing through a village and at night on their way. In this way, the children who live and spend the night in Surau can find out information outside their town and the life situation overseas. So the Surau has a multi-functional role because it is also an information centre [44].

With so many functions of the Surau, in the concept of disaster management, Surau can also provide knowledge, training, and education on disaster preparedness, for example, in determining evacuation locations, evacuation mechanisms, and actions that must be taken when a disaster occurs. In addition, giving direction to the community in the surau will be more effective than gathering the community in a formally designed Nagari/village hall.

In contrast to the pioneering community of Mandeh, which defined hazards based on an understanding of the physical conditions of the environment in which they lived, the Mandeh community currently does not only define hazards based on the physical vulnerability of their area but also based on public policy perspectives and issues. A document released by the Regional Disaster Management Agency (BPBD) of Pesisir Selatan Regency is one of the sub-districts with the highest potential for natural disaster vulnerability.

Referring to the facts above, Mandeh can be categorized as an area with a high level of danger from earthquakes, flooding, and tsunamis. Information about potential hazards in an area can be identified through various methods, including historical and empirical [27]. Historical descriptions, especially stories that developed in the community, believed that Mandeh was an area prone to earthquakes and high tides. This is also reinforced by the fact that people who live in the lowlands are often hit by tidal flooding. Tangah village is the centre of residential areas right opposite the ocean. This means that high tides can threaten people's lives during certain seasons.

To minimize the risk of damage and accidents caused by the earthquake in Mandeh, the pioneers who lived in Mandeh chose the location of the settlement with careful consideration. Kampung Tangah – which means a village located in the middle because in the north it faces the West Coast of Sumatra and in the south, it is fortified by the Bukit Barisan hills – as the forerunner of settlement in Mandeh was established in the lowlands. The determination of the location did not escape the understanding at the time, which believed that houses built in sandy lowlands were least affected by earthquakes, while those in highlands were most prone to earthquakes [42].

Meanwhile, to overcome the danger of tidal flooding, houses on stilts were built. The height of the house on stilts is adjusted to the water level that usually inundates the local area. The traditional stilt houses that are still standing today are one to one and a half meters high. The stage model causes the house to be free from tidal inundation so that the activities of the residents and the community do not get many challenges.

The people who inhabited the early days of the development of the Nagari were aware of the potential dangers that threatened their territory. Therefore they develop a coping mechanism. Coping mechanisms are "various internal social structures that help individuals and families through difficult periods" [45]. In the threat of disaster, the coping mechanism is a collective instrument for community action. The coping mechanism pattern is determined by interaction and social cohesion in Society.

People with a high level of interaction and strong cohesiveness tend to collectively communicate the social problems they face and then formulate alternative solutions for elements in Society. Coping strategies developed collectively are transferred and disseminated to each community member so they have the knowledge and skills to react to disasters. Margareth Kieffer classifies coping mechanisms into i) internal and ii) external. The internal mechanism consists of social units, religious institutions, political organizations, and economic systems. While the external mechanism: "includes social organizations, church-related groups, political organizations, economic institutions, social and economic development organizations, and in some cases, the national government" [45].

Looking at the coping mechanisms developed by the pioneers of Mandeh, it can be seen that the internal coping mechanisms formed through social units dominate the pattern of community resilience to earthquakes and tidal floods. Social units, especially the nuclear family and extended family, become a forum for forming and spreading coping mechanisms. According to Mandeh community leaders, the pioneers who previously inhabited Mandeh consisted of people who still had kinship relations. Thus it can be predicted that their relationship is quite close. Likewise, with a pattern of good communication between them because the settlements tended to be centralized at that time. Moving on from the description, the pattern of forming coping strategies in the early period of Mandeh's existence can be described as follows.

Figure 1 shows the process of forming coping strategies in the pioneering community of Mandeh, which was developed through the interaction of residents in social units or organizations. This strategy is enriched by elements of universal knowledge and components of local genius.

Along with changes in the perspective of the people of Mandeh towards the concept of danger, the community's strategies in dealing with disasters also vary. If the pioneers developed coping mechanisms through social units, Mandeh now takes advantage of economic interests and relations to create coping strategies. To maintain economic interests while at the same time maintaining environmental sustainability, community members conserve and cultivate mangroves in waters facing the high seas. This action is part of the efforts of community members to support the sustainability of the fish in the seas of Mandeh because mangroves provide natural food that is good for fish growth. This action is expected to provide an economic contribution to community members in the long term. In addition to financial benefits, mangroves are believed to function as a tsunami breakwater so that the impact and damage suffered by the community due to the tsunami can be minimized.

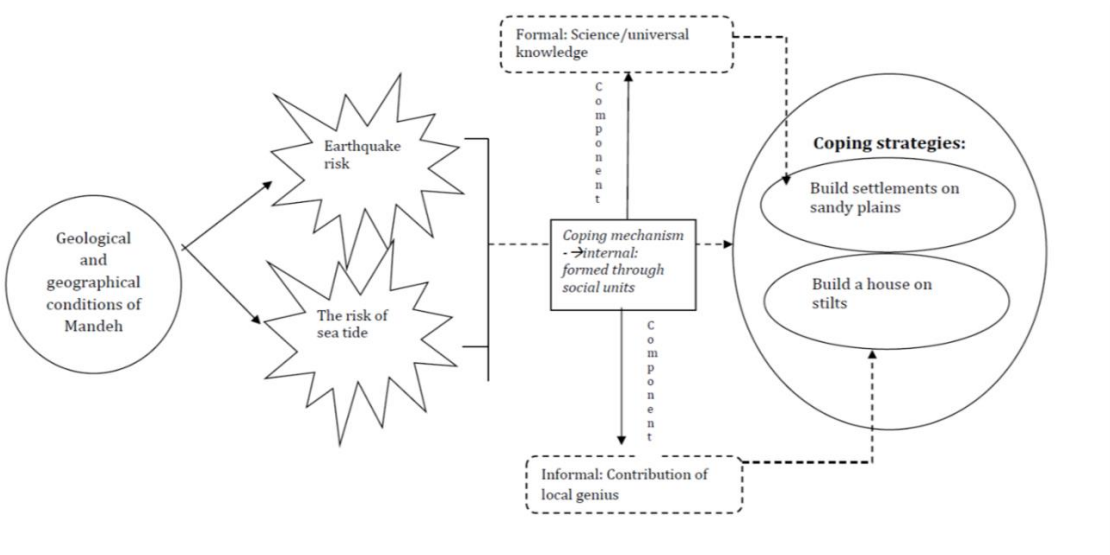


**Figure 1.** The pattern of forming coping strategies in the early period of Mandeh's existence

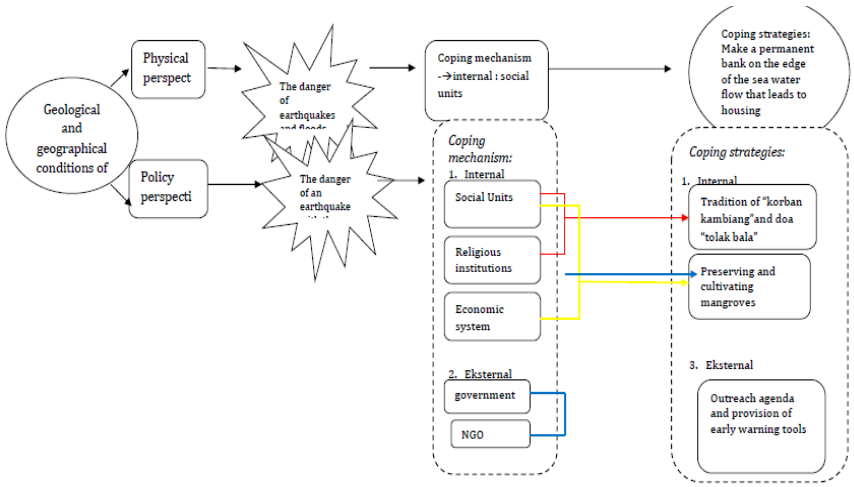


**Figure 2.** Patterns of forming coping strategies in the modern Nagari Mandeh community

Besides economic units, social units are still institutions that play a role in forming coping mechanisms. The Mandeh community consists of the Minangkabau ethnic group, more oriented towards the extended family. A man is responsible for his wife and children (nuclear family) and his extended family. The relationship of saparuik, sakaum, sasuku, and sanagari in Minangkabau Society is headed by men even though the lineage is matrilineal [46]. The role of men as Mamak of the tribe/tribe in conveying information to their tribe/tribe members is still ongoing.

At a certain period, these social units and religious institutions develop specific resilience strategies, such as the slaughter of goats accompanied by collective prayers to protect their area from danger. Based on adat basandi syara'; syara' basandi kitabullah, Traditional practices internalized before the entry of Islam were inserted with religious values as a justification that traditional/cultural rituals did not conflict with Islamic rules. The Minangkabau people believe Islam and adat have been well integrated within their social system. As a form of this unification, another petitih inscription also appeared: syara'mangato, adat mamakai (religion says customs are used), which means that all conditions of religious teachings, especially those originating from the Qur'an and the Prophet's hadith, are applied through business. Another is saying isadat yang kawi, syara' yang lazim(traditions are upright, then religion will be expected), meaning that customs will not be proper if they are not confirmed by faith. In contrast, religion will not work if it is not normalized (applied) through business [47].

The fact shows that slaughter, which means sacrificing certain animals to be later thrown into the sea, has existed since the age of dynamism. Thus, there is a tendency that the pioneers of Mandeh have carried out the ritual of rejecting reinforcements as part of an effort to maintain the safety of nature and Society from harm. Along with the entry and spread of Islam in Indonesia in the 13th century, this belief experienced syncretism with the religions of monotheism and polytheism [48]. The ritual of rejecting reinforcements is no longer just slaughtering animals and spreading blood or malarung their bodies in specific locations. It is also accompanied by the reading of prayers and tausiyah from Islamic religious leaders. The following is a visualization of the formation of coping strategies in the contemporary Mandeh Society:

Furthermore, the difference between the patterns of coping strategies in Figure 1 and Figure 2 is the involvement of external parties in the form of policies, regulations and knowledge managed by the Government and other formal

institutions. In Figure 2, it is explained that the conception of disaster in the Mandeh Nagari community now does not only come from physical vulnerability but also comes from the perspective of policy issues contained in the BPBD document for Pesisir Selatan Regency. It is undeniable that an issue becomes necessary when an institution in the political system becomes related to the issue, likewise with the issue of a tsunami that has the potential to hit the West Coast of Sumatra after the publication of McCloskey et al.'s research in 2005 on the National Geographic website. The media made this issue the public's primary concern, gaining political attention.

Figure 2 also describes the units that play a role in the formation of coping mechanisms in the present Kanagarian Mandeh community, which are relatively the same as the pioneering community. The difference is only on the collaboration side. In the past, social, economic, and religious units tended to move independently in developing coping strategies. However, collaboration mechanisms have been identified, such as between social units and the economic system, in developing coping strategies in the form of mangrove cultivation. This collaboration facilitates the dissemination of disaster information among community members and enriches ideas for surviving and anticipating the impact of disasters.

In addition to internal mechanisms, external strategies for dealing with disasters have been developed through local governments, the central Government, and NGOs. The Regency Government designed a structural and non-structural mitigation program in shelter construction and training for the community. Unfortunately, this program has not touched the people of Mandeh due to budget constraints. NGOs have also not explicitly mobilized mitigation programs in Mandeh. As a result, the community is still solitary in dealing with the threat of disaster. The mechanism of community resilience to disasters cannot be separated from the coping strategies they take. Resilience is the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the systems to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organize, channel, and learn in response to a threat" [27].

Starting from the patterns adopted by the Nagari Mandeh community in dealing with disasters, it can be seen that the disaster resilience mechanism owned by the Nagari Mandeh community is built from a series of capitals. Capital is the basis of domination (although the participants do not always recognize it) [49]. Through the dominance of certain groups/individuals, information and patterns of resilience to disasters are internalized in the Mandeh community. The capital series are:

**Social Capital**

Matrilineal relations are one of the components of social capital that significantly influence disseminating information and building group resilience. Men who have the status of Tungganai, Mamak, or penghulu have the role of educating their nephews and tribal members. Meanwhile, women who are bundo kanduang become protectors and observers of the welfare of the members of the Rumah Gadang. Welfare is not only economic oriented but also security and comfort. It is undeniable that primordial ties such as kinship are the most effective typology of social capital because they are built since a person is born [50]. In the case of saparuik, sasuku, and sacaum relations, there is a tendency for this bond to be strengthened when the members live close together. This physical and psychological closeness reinforces building disaster resilience mechanisms for communities with strong Minangkabau roots.

On the other hand, as part of a prismatic society characterized by the overlapping of traditional and modern institutions [51], where the existence of customary holders cannot be separated from formal leaders, the role of adat holders and the function of the structure of adat institutions is still sufficient. Dominant in Society in Nagari Mandeh is used as a vehicle to build community resilience to disasters. Ulama also often mention disasters from a religious perspective through lectures and studies at the surau. Together with Niniak Mamak and cadiak clever, the ulama are leaders of the Nagari who are in a collective institution known as the Kerapatan Adat Nagari (KAN).

Since the enactment of the West Sumatra Regional Regulation (Perda), number 9 of 2000, which was later revised by Regional Regulation number 2 of 2007, the position of customary stakeholders has been strengthened because the administration of the Government no longer separates administrative affairs from ordinary affairs, so that the Nagari Government with its original autonomy can develop democratic community participation by utilizing living cultural values and the role of existing institutions as working partners [46] in building community welfare in various fields including building community resilience to disasters.

**Cultural Capital**

Specifically, the metaphor of cultural capital comes from Bourdieu's thoughts when he developed the idea of 'habitus.' Bourdieu asserts that groups can create cultural symbols as differentiators, which mark and establish their position in the social structure [50]. Cultural capital can cover many properties, such as art, education, and language forms.

In the case of Nagari Mandeh, the consumption of community members for cultural arts is also related to the saga that has been passed down from generation to generation. Until now, people in Nagari Mandeh still believe that natural disasters are marked by the sound of a kuok (a type of peacock) buzzing around the village. This sound they will not hear on a typical day / normal. In addition, the community believes that large stones (the type of parent rock) located in the hills that surround their village will emit a sound that echoes each other as a message that disaster will come. The mountain where these large stones are located has become a sacred place by the community. For a long time, this place is still frequented by residents outside the area. However, lately, the number of visitors has decreased along with the sound of large stones being no longer heard despite the disaster that hit Nagari Mandeh.

Referring to Navis' opinion, the Minangkabau people's conception that often uses the metaphor of plants and animals comes from a keen observation of all the contents of the nature in which they live. The shape, nature, and behavior of flora, fauna, and inanimate objects are metaphorically used in all aspects of life to be used as a teaching and a way of life. Furthermore, these teachings and views of life are translated into the proverbs petition, pituah, mamangan, and thimble. The petitih adage was then spread through oral traditions from generation to generation [52]. This phenomenon is reinforced by Hamilton: "In a society whose written culture came later and only belonged to a privileged class, the customary laws for the area and the collection of moral teachings together various

teaching practices for daily life, based on keen observations of natural phenomena, were passed down. to later generations in the form of a proverb still often used" [53].

The excerpt above shows that the proverb is a library of knowledge for the Minangkabau community. Inheritance of thoughts and rules of life can be passed on from one generation to the next by imprinting them into a petitih proverb which is then memorized to become an inheritance or heirloom [53].

The belief of the Minangkabau community in Nagari Mandeh towards natural signs originating from the petitih proverb and then being disseminated orally only lasts for several generations. The saga of the kuok and the sounding stone is known to only a few community members. Not many young people see this story because of breaking the tradition of memorizing and passing down saga between generations. Even if there are young people who know this saga, not all of them can understand the symbolic meaning contained in it. Thus, the informative function included in the saga of the kuok bird and the sounding stone is relatively faded along with the reduced intensity of the spread of the saga and the lack of mastery of the younger generation towards the Minangkabau tradition.

**Economic Capital**

Most of the Mandeh community work as fishermen, making the sea their main livelihood. As an area still natural and natural as a producer of fresh fish, the community is economically independent enough to meet their daily needs. The unspoiled mangrove forest becomes a nesting place for fish which is a source of livelihood.

Based on the research findings, historically, the Mandeh people were immigrants from the southern region of West Sumatra. In an area surrounded by the sea, the majority of the people are stuck working as fishermen. The sea products they get will be traded to the capital of the XI sub-district of Koto Tarusan, Painan City, or Padang City. Apart from fishers, the Mandeh community also cultivates crops and farms because it is supported by a large amount of vacant land around the Nagari.

**Geographical Capital**

Nagari Mandeh is located in the District of Koto XI Tarusan in the Pesisir Selatan Regency. Nagari Mandeh is directly adjacent to the city of Padang. This area is located at 10 11' 00" South Latitude to 10 12' 00" South Latitude and 1000 25' 00" East Longitude to 1000 27' 00" East Longitude. the height of the centre of Government from sea level is 5 meters. The landscape of Nagari Mandeh faces the sea and is in the bay. Pay attention to the following land use map (Figure 1). Nagari Mandeh is surrounded by forests, mangroves, thatch, and hills.

Nagari Mandeh has an area of ± 18,000 ha, consisting of three villages. Administratively, Nagari Mandeh has the following boundaries:

1. North: Nagari Duku
2. South: Nagari Nanggalo
3. West: Samudera Indonesia
4. East: Nagari Duku

The following results are obtained from the effects of visual image interpretation on Google high-resolution images and field surveys using the GPS (Global Positioning System) tracing method. Settlements have an area of 13 Ha, Mangroves have an area of 71 Ha, Rumbia has an area of 12.8 Ha, Forests have a place of 1483.7 Ha, and Rice fields have an area of 22.3 Ha.

In Nagari Mandeh, asphalt and concrete are already in place for road transportation facilities. The total length of the road is 11 km. Almost 90% of the streets can be passed by four-wheeled vehicles. The road access to Nagari Mandeh is currently under construction from the south side of Carocok port, Tarusan. And all houses have had electricity connection since 2003. Meanwhile, the rice fields are still rainfed because there is no irrigation canal.

Based on the 2013 study map from the National Disaster Management Agency, this area is vulnerable to earthquake and tsunami hazards. Suppose you pay attention to the earthquake and tsunami inundation/inundation (Figure 2 and Figure 3). it can be concluded that the Nagari Mandeh earthquake, primarily in residential areas, was relatively safe. However, almost all settlements and rice fields in Nagari remain in the tsunami inundation area for tsunami inundation. From the interviews with residents, during the 2009 earthquake in Padang, the area around the Tangah/tuo village was damaged on average. In 2010, the Mentawai tsunami reached this area, but it did not cause much damage because there are mangroves and thatch which form the natural fence of this Nagari as seen in Figure 3 and Figure 4 below:

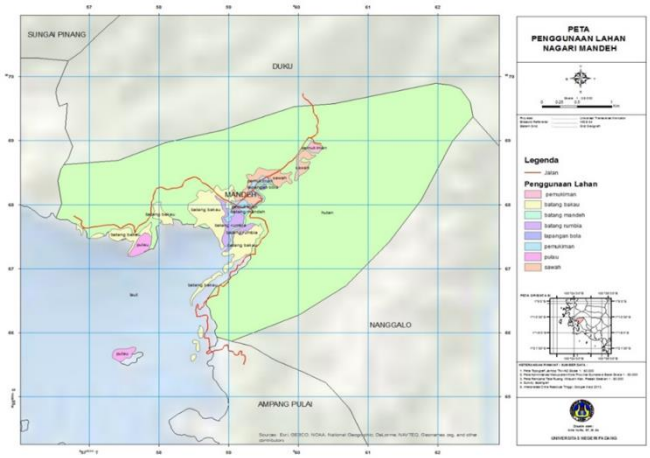


**Figure 3.** Land use map of Nagari Mandeh

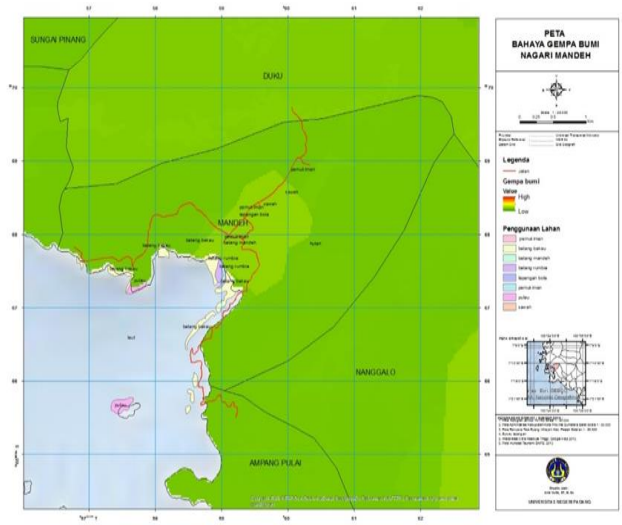


**Figure 4.** Earthquake hazard map in Nagari Mandeh

## 4. CONCLUSIONS

The conclusion of this research is: The patterns of coping strategies owned by the Nagari Mandeh community have contributed to forming a community resilience mechanism against the potential for a tsunami disaster that is predicted to hit the coastal area of XI Koto Tarusan District. Although there is a shift in the pattern of coping strategies – from pioneers to contemporary Society – in general, social capital and cultural capital have a dominant influence in building resilience to natural disasters. Furthermore, Nagari Mandeh has several assets to build community resilience against natural disaster risks.

a) Social capital, where the socially stable community has the advantage of a very close relationship between the community. As Society tends to be homogeneous, family relationships dominate the communication pattern between them. In addition, the integration between the customary structure and the lowest government structure, namely the Nagari, makes social relations a determining factor, including increasing community resilience to disasters.
b) Cultural Capital, culturally, the Mandeh people have had their way of anticipating disasters from generation to generation, namely, learning from signs in nature. In Mandeh, it was found that people listen to animal sounds to predict an impending disaster and prepare for it. However, the ability to read natural signs is not conveyed correctly to the current generation.
c) Economic Capital, the Mandeh area, dominated by closed bay waters and mangrove forests, which are fish nests, makes the Mandeh community economically dependent on marine products. In addition, the Mandeh area is also surrounded by agricultural land, which is also the community's livelihood.
d) The geographical capital of Nagari Mandeh is in a pretty remote area where access to the Nagari is quite tricky. But, on the other hand, in the Nagari Mandeh area, which is between mountains directly connected to the sea, making access to escape in the event of a tsunami is not so difficult because the evacuation location is in the hills are, pretty close to the community settlements.

In building community resilience to disaster risk, Nagari Mandeh, as part of the Pesisir Selatan Regency, has some local wisdom that has been pioneered by their predecessors, including the role of Niniak Mamak in fostering their nephew's children, where ninik Mamak has a very central function in the Nagari. Using the natural philosophy of takambang as a teacher in everyday life, the movement back to the surau as a form of local wisdom makes the surau a center for fostering social life, including the field of disaster risk management.

The limitation of the results of this research is that the influence of social capital, cultural capital, economic capital and geographic capital in more detail on the development of resilience to natural disasters has not been described in detail. Future research is expected to be able to design a more comprehensive resilience model development using more varied data collection methods.

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